7-B
ROUTE 9 SITE SENSITIVE AREAS TECHNICAL REPORT

FINAL
ENVIRONMENTAL
IMPACT STATEMENT

Brightwater
Regional Wastewater
Treatment System

APPENDICES

King County Brightwater TREATMENT SYSTEM

Final

Appendix 7-B
Route 9 Site Sensitive Areas Technical Report

October 2003

Prepared for King County by
Adolfson Associates, Inc.
Seattle, WA

For more information:
Brightwater Project
201 South Jackson Street, Suite 503
Seattle, WA 98104-3855
206-684-6799 or toll free 1-888-707-8571

Alternative formats available upon request
by calling 206-684-1280 or 711 (TTY)

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Executive Summary

Adolfson Associates, Inc. (Adolfson) conducted sensitive area studies and prepared this technical report for a 114-acre site located immediately east of State Route 9 (SR-9) and northwest of State Route 522 (SR-522) in unincorporated Snohomish County, Washington. This site is one of two sites being considered by the King County Wastewater Treatment Division for development as a new regional secondary wastewater treatment plant. This property is referred to as the Route 9 site in the *Brightwater Draft Environmental Impact Statement: Brightwater Regional Wastewater Treatment System November 2002* (King County, 2002a).

The Draft EIS evaluated the probable significant adverse environmental impacts and mitigation measures at two treatment plant sites, the Route 9 and Unocal sites. The Final EIS responds to comments on both plant sites and provides more detailed analysis on both the Unocal and Route 9 treatment plant sites. Prior to issuance of the Final EIS, King County is providing in this report more detailed information on sensitive areas at the Route 9 Site. Route 9 Site is one component of the Preferred Alternative identified by King County in the Final EIS. A separate technical report on the Unocal site is also being issued.

The Route 9 site consists largely of developed areas, with vegetated habitat areas on the north and east portions of the site. The site contains approximately 37 acres of vegetated habitat. Five main habitat types were identified on the site during field surveys. These include: 1) developed areas; 2) upland forest, shrub, and grassland; 3) forested/scrub-shrub wetland and riparian; 4) emergent wetland; and 5) open water.

Five wetlands (A through E), three streams (Howell Creek, 228th Street Creek, and Unnamed Creek), and several other mostly piped watercourses are located on the site. All of the onsite wetlands and streams, except for Howell Creek, are located on the north portion of the site. Little Bear Creek, a mainstem tributary to the Sammamish River, parallels SR-9 to the west. Onsite streams and watercourses flow to Little Bear Creek via culverts beneath SR-9. Only the new arch culvert that conveys flows from the 228th Street Creek fish ladder is designed to accommodate anadromous fish passage and access to streams on the site.

The site's wetlands were rated in accordance with both Snohomish County Code and the Washington State Department of Ecology Rating System for Western Washington. Wetlands A and C are rated as Category II wetlands, while Wetlands B and D are rated as Category III wetlands using these rating systems. Streams were rated according to the State Water Typing system, which is also used in the Snohomish County Code. All of the streams are considered Type 3 or Type 4 streams.

Up to 16 special status wildlife species may occur on the site. Special status species include species designated by federal or state government agencies as endangered, threatened, proposed, candidate, sensitive, and monitor and species of local importance. Three of these species, the bald eagle, Puget Sound chinook salmon, and bull trout, are federal threatened species.

TABLE OF CONTENTS

LIST OF TABLES

Introduction

King County has prepared a Draft Environmental Impact Statement (Draft EIS) and Final Environmental Impact Statement (Final EIS) on the Brightwater Regional Wastewater Treatment System. The Final EIS is intended to provide decision-makers, regulatory agencies and the public with information regarding the probable significant adverse impacts of the Brightwater proposal and identify alternatives and reasonable mitigation measures.

King County Executive Ron Sims has identified a preferred alternative, which is outlined in the Final EIS. This preferred alternative is for public information only, and is not intended in any way to prejudge the County's final decision, which will be made following the issuance of the Final EIS with accompanying technical appendices, comments on the Draft EIS and responses from King County, and additional supporting information. After issuance of the Final EIS, the King County Executive will select final locations for a treatment plant, marine outfall and associated conveyances.

The County Executive authorized the preparation of a set of Technical Reports, in support of the Final EIS. These reports represent a substantial volume of additional investigation on the identified Brightwater alternatives, as appropriate, to identify probable significant adverse environmental impacts as required by the State Environmental Policy Act (SEPA). The collection of pertinent information and evaluation of impacts and mitigation measures on the Brightwater proposal is an ongoing process. The Final EIS incorporates this updated information and additional analysis of the probable significant adverse environmental impacts of the Brightwater alternatives, along with identification of reasonable mitigation measures. Additional evaluation will continue as part of meeting federal, state and local permitting requirements.

Thus, the readers of this Technical Report should take into account the preliminary nature of the data contained herein, as well as the fact that new information relating to Brightwater may become available as the permit process gets underway. It is released at this time as part of King County's commitment to share information with the public as it is being developed.

Adolfson Associates, Inc. (Adolfson) conducted sensitive areas studies and prepared this technical report for an approximately 114-acre site located in unincorporated Snohomish County, Washington (Figure 1). This site is one of the two sites proposed by the King County Wastewater Treatment Division (WTD) for development of a new regional secondary wastewater treatment plant. This technical report is intended to supplement the information in Chapter 7, Plants and Animals, of the Final EIS. The property is hereafter referred to in this report as the Route 9 site. This property is referred to as the Route 9 site in the *Draft Environmental Impact Statement: Brightwater Regional Wastewater Treatment System November 2002* (King County, 2002a).

The following sections describe the site and document existing habitat, stream, and wetland conditions. The report also notes documented presence of "special status" species on the site, which include federal and state endangered, threatened, proposed, candidate, sensitive, and monitor species and species of local importance. Figures and photographs are provided following the text of this report.

Site Description

The proposed Route 9 Brightwater treatment plant site is located immediately east of State Route 9 (SR-9) and northwest of State Route 522 (SR-522) in unincorporated Snohomish County. The Route 9 site consists primarily of developed areas, with vegetated habitat areas on the north and east portions of the site. Heavier industrial uses, such as auto wrecking yards and lumber storage, are concentrated on the southern portion of the site. The central portion of the site includes food processing facilities (Stock Pot Soups) and other light industrial and commercial uses, while the northern portion of the site includes a vacant parcel, a landscape maintenance business office, and equipment storage (Figure 1). Most of the vegetated areas of the site are located on the vacant parcel (Northshore School District) and the landscape business parcel, as well as a steeper slope between the eastern boundary of the site and a set of active railroad tracks to the east. The site is approximately 114 acres in size, with approximately 37 acres of vegetated habitat. Figure 2 illustrates habitat types on the site.

Methods

Review of Existing Documentation

The preparation of this report included a review of agency databases and maps (USFWS, 2003; WDFW, 2003; Snohomish County, 1987), and of technical studies documenting conditions on the site. Past and present aerial photography was also used to document habitat changes and current habitat types on the site (U.S. Army Corps of Engineers, 1944; Walker & Associates, 2003; King County, 2002b). Sensitive area studies from the OPUS Northwest LLC, Woodinville North Joint Venture, and Northshore School District were also reviewed. Relevant existing information presented in these studies is discussed in the Findings section of this report. The referenced studies are listed in the References section.

Field Investigation

A total of 11 days of field survey were conducted on the site to evaluate habitat, wetland, and stream conditions. Field surveys were conducted on December 27, 2001; on January 2, 4, 7, and 15, 2002; on March 28, 2002; on May 21, 2002; and on January 22, 30, February 3, and March 26, 2003. Wetlands C and D were delineated by Adolfson on January 22 and 30, 2003, and Wetlands A and B were delineated by Talasaea Consultants on October 29, 2002 and February 5, 2003. Figures and photographs taken during field surveys are located at the end of the text.

Habitat assessment methods described in *Wildlife–Habitat Relationships in Oregon and Washington* (Johnson and O'Neil, 2001) were used to describe and evaluate habitat types on the site. Methods defined in the *Washington State Wetlands Identification and Delineation Manual* (Ecology, 1997), a manual consistent with the *Corps of Engineers Wetlands Delineation Manual* ("1987 Manual") (Environmental Laboratory, 1987) were used to determine the presence and extent of wetlands on the project site. Wetland functions and values were assessed using the

methodology presented in *Wetland Functions Characterization Tool for Linear Projects* (Null et al., 2000).

Onsite streams were identified in accordance with the definition described in Snohomish County Code (SCC) Chapter 32.10.110 (39) and were field located and mapped as required by SCC 32.10.320(4)(a). Physical characteristics recorded included channel width, channel depth, streamside riparian structure, large woody debris composition, and substrate conditions. Field investigations included consultations and field visits with the U.S. Army Corps of Engineers, Washington State Department of Ecology, Washington State Department of Fish and Wildlife, and Snohomish County on February 5 and 6 and April 8, 2003.

Findings

Historically, the Route 9 site was likely covered with forest. The Route 9 site has been used for agriculture in past years, and for industrial and commercial developments in both past and present years. According to aerial photos taken in 1944, the south and central portions of the Route 9 site were cleared for agriculture 60 years or more ago (U.S. Army Corps of Engineers, 1944). Industrial development began at the south end of the site in the 1970s, and through the 1980s and 1990s industrial and commercial development expanded across the site (Walker & Associates, 2003).

Wetlands and streams on the north portion of the site have been previously described in several recent studies and some are also identified by Snohomish County (1987). Raedeke (1997) identified three wetlands and one main stream channel on the Northshore School District property. Talasaea (1998) described one wetland and one stream (228th Street Creek) that existed on the Woodinville North Business Park site before the site was developed. As part of this development, 228th Street Creek was piped and rerouted to the northwest corner of the business park site (LSA, 2000). A fish rearing pond system that connects the piped and rerouted 228th Street Creek with Little Bear Creek was also constructed as part of this development, displacing the wetland. Talasaea (2003) has also identified two wetlands associated with Unnamed Creek on the VRJ LLC landscaping property at the north end of the site.

According to the WDFW's Habitats and Species database (WDFW, 2003), there are no bald eagle nests or other terrestrial priority species documented on the project site or within 1 mile of the project. The Washington Natural Heritage Program has not identified endangered, threatened, or sensitive plants or high quality ecosystems on the site or within 3 miles of the project site (WA DNR, 2002).

Habitat Types

Five main habitat types (Johnson and O'Neil, 2001; Cowardin et al., 1979) were identified during field surveys. The following five habitat types are identified on Figure 2 and are listed in descending order of occurrence:

- Developed Areas (67 percent of site)
- Upland forest, shrub, and grassland (26 percent of site)
- Forested/scrub-shrub wetland and riparian (2.3 percent of site)
- Emergent wetland (1.0percent of site) and
- Open water (0.4percent of site)

Overall, industrial and commercial development dominates the south and central portions of the site, and upland forest is the dominant habitat type on the north portion of the site. Groundwater-fed wetlands and streams (forested/scrub-shrub/emergent wetlands and open water) are located mostly on the north portion of the site. Open water habitat includes a detention pond and fish rearing pond with fish ladder that were constructed as part of the Woodinville North Business Park development (LSA, 2000). Each of these five habitat types is discussed below in greater detail.

Developed Areas

Developed areas occupy the largest portion of the Route 9 site. This land use consists of approximately 77 acres of industrial and commercial land with nearly 100 percent impervious surfaces. The south portion of the site contains auto wrecking yards and other industrial storage areas (Photo1). Developed areas on the central portion of the site are characterized by fill soils and are contaminated by petrochemicals in some areas (Enviros, 1996; AGRA, 1997; NCAI, 2000a and b; Terra, 2001; Farallon, 2001a, b, and c).

Stormwater runoff from the south and central portions of the Route 9 site and groundwater emanating from the abutting slope to the east flows through onsite pipes and ditches (Photo 2) before discharging to Little Bear Creek, located west of the site and across SR-9.

Small areas of maintained grass and landscape plantings are present near buildings and along SR 9. Weedy, non-native plant species such as Scot's broom and Himalayan blackberry and grasses occupy disturbed areas adjacent to parking lots and roads.

Wildlife species observed in urban habitats on the site include American crow, domestic rabbit, and gull species. Other common species likely to be present include European starling, house sparrow, eastern gray squirrel, Virginia opossum, raccoon, rat, and mouse.

Upland Forest, Shrub, and Grassland Habitats

Upland forest, covering approximately 29 acres, is the dominant habitat type on the north portion of the site and on the steep slope between SR 522 and the commercial area immediately offsite (Figure 2). A small area of upland forest also exists on the south portion of the site. Upland grassland habitat covers approximately 3.2 acres on the north portion of the site (Figure 2). Upland shrub communities are interspersed between forest and grassland habitats and cover a minimal area.

Dominant trees in forest areas include red alder, western red cedar, big leaf maple, Douglas fir, western hemlock, and black cottonwood (Photos 3 and 4). Common understory shrubs and herbs

include salmonberry, sword fern, salal, and Oregon grape. Invasive, non-native plants that are common in some of the site's forested areas include Himalayan blackberry and reed canarygrass. Black cottonwood saplings grow densely in upland shrub habitats, and bentgrass, velvetgrass, and a mix of weedy herbs dominate upland grassland habitats.

Forest structure, including tree-, shrub-, and grass-dominated habitats, varies widely on the Route 9 site as a result of changing ownership and management of this land during the past 50 or more years. Past forest clearing is evident in most areas. Soils in upland grassland habitats have been disturbed due to past grading and filling activities as evidenced by the presence of glass and rock fill soils to depths of 11 inches or more.

Most forest areas are dominated by medium and small deciduous and coniferous trees with a relatively dense shrub layer. Some areas on the north portion of the site are dominated by large western red cedar and Douglas fir trees with lower-growing evergreen shrubs in the understory (Photo 3). Tree saplings and/or grasses dominate recently disturbed areas (Photo 4). Habitat elements or features scattered throughout forest areas on the site include snags, downed logs, stumps, moss and lichens, leaf litter, dense shrub thickets, roads, trails, and adjacent streams and wetlands.

Bird species observed in forest areas include black-capped chickadee, dark-eyed junco, winter wren, red-tailed hawk, song sparrow, golden-crowned kinglet, American robin, American crow, northern flicker, pileated woodpecker, barn owl, red-breasted nuthatch, and spotted towhee. Deer trails and scat and mountain beaver burrows were observed in forested areas located near the Burlington Northern-Santa Fe (BNSF) rail line. Numerous vole trails and one vole were observed in areas with open forest canopies. Pacific chorus frog vocalizations were heard in forest habitats on the north portion of the site.

Wetland Habitats

Five wetlands (Wetlands A through E) have been identified on the Route 9 site (Figure 2). These wetlands are described from north to south in this report. A number of offsite wetlands border the site to the north, east, and west, and wetlands associated with Little Bear Creek are located west of and adjacent to SR-9. Wetlands on the site are derived primarily from groundwater seeps and springs, and all of the wetlands are located on the north portion of the site. Wetlands A, B, C, and E are also associated with streams. Vegetation community types in wetlands include forested, scrub-shrub, and emergent habitats. A summary of each wetland description is provided in Table 1. Property ownership and parcel locations are illustrated in Figure 1.

Wetland A

Wetland A is located on the VRJ LLC property on the northernmost end of the Route 9 site between a gravel work area and the BNSF railroad line. The onsite portion of Wetland A is 0.5 acre in size; however, the wetland extends offsite to the north beneath an old road grade. Wetland A is a palustrine forested (PFO) wetland associated with Unnamed Creek and groundwater springs (Photo 5).

Table 1. Wetland Classifications and Descriptions

Wetland	Wetland Size (Acres)	Hydro-Geomorphic Classification	Associated Streams	Cowardin Class A	Ecology Rating B (Cat.)	Snohomish County Rating	Snohomish County Buffer (ft)	Vegetation (dominant species)	Mapped Soil Type C	Observed soils
A	0.5 (onsite)	Depressional outflow	Unnamed Creek	PFO	II	2	75	red alder black cottonwood western red cedar salmonberry youth-on-age	McKenna gravelly silt loam, Norma loam, Alderwood gravelly sandy loam	Silty clay loam to loam
B	0.26	Depressional outflow	Unnamed Creek	PFO	III	3	50	Similar to Wetland A	McKenna gravelly silt loam	Gravelly sandy loam
C	3.14	Slope and Depressional outflow	228th Street Creek, Channel A	PEM PFO	II	2	75	reed canarygrass bentgrass western red cedar red alder salmonberry	Norma loam, Alderwood gravelly sandy loam	Fill material and loam
D	0.97	Depressional outflow	None	PSS	III	3	50	Sitka willow Pacific willow red alder black cottonwood	McKenna gravelly silt loam, Norma loam	Fill material and loam
E	0.14	Depressional outflow	228th Street Creek	POW	III	3	25	willow soft rush	Everett gravelly sandy loam	-

A **Wetland Classifications:** PEM-Palustrine Emergent, POW–Palustrine Open Water, PSS-Palustrine Scrub Shrub, PFO-Palustrine Forest, Cowardin et al., 1979.
B Washington Department of Ecology's Wetland Rating Systems: for Western Washington, Second Edition, August 1993, Publication #93-74.
C Soils from Soil Survey of Snohomish County Area Washington, Debose and Klungland, 1983.

The forest canopy in Wetland A is dominated by red alder. Salmonberry dominates the shrub layer, while the herbaceous groundcover includes youth-on-age, lady fern, horsetail, and skunk cabbage (Talasaea, 2003).

Principal functions of Wetland A include flood flow alteration, water quality improvement, erosion control, production and export of organic material (carbon), general habitat, and habitat for aquatic invertebrates. Wetland A is a depressional outflow wetland that receives overflows from Unnamed Creek. Surface water from agricultural areas and highways upstream are filtered through herbaceous vegetation in Wetland A. Deciduous woody and emergent vegetation provides organic material for export to Little Bear Creek. Mature forest vegetation within and surrounding the wetland provides habitat for a variety of native wildlife species, though open water habitat for more wetland-associated species, such as for waterfowl, muskrat, and beaver, is lacking. Common wildlife signs observed within and near the wetland include mountain beaver burrows, pileated woodpecker excavations, and Pacific chorus frog calls. Fish habitat in Wetland A is likely limited due to a long culvert, high gradients, and low stream flows. Various rock and wood substrates are available for aquatic insects. The overall functions of Wetland A, especially habitat, water quality improvement, and erosion control, would likely be higher if this wetland were not separated from Wetland B by a gravel parking lot and culvert.

Wetland B

Wetland B is located on the VRJ LLC property between a gravel work area and SR-9. The total wetland size is 0.26 acre, and the portion of wetland located within the site boundary (outside of the SR-9 right-of-way) is 0.23 acre. Wetland B is a palustrine forested (PFO) wetland associated with Unnamed Creek and groundwater springs.

Young red alder trees dominate the tree canopy layer of Wetland B. Salmonberry and Himalayan blackberry dominate the shrub layer, while the herbaceous groundcover includes lady fern, youth-on-age, skunk cabbage, common horsetail, stinging nettle, and tall mannagrass (Talasaea, 2003) (Photo 6).

Principal functions are the same as for Wetland A; both wetlands are depressional outflow wetlands that receive surface water from Unnamed Creek. However Wetland B, because of its smaller size and more disturbed condition, provides lower habitat, organic export, and water quality functions than Wetland A. Wetland habitats are more disturbed by current and previous human activities in Wetland B than in Wetland A. Fewer wildlife signs are present and wetland and buffer vegetation is lacking in some areas, providing less potential for water quality improvement and organic export than in Wetland A. However, fish habitat functions may be higher in Wetland B than in Wetland A because gradients are lower and there is one less blockage/culvert. Various substrates are available for aquatic insects, and fish have been observed in the stream (Talasaea, 2003). As with Wetland A, the overall functions of Wetland B would likely be higher if this wetland were not separated from Wetland B by a gravel parking lot and culvert. Portions of the wetland buffer are developed and it is likely that wetland areas formerly associated with Unnamed Creek between Wetlands A and B were filled when the gravel lot was constructed.

Wetland C

Wetland C is 3.12 acres in size and extends across the south portion of the Northshore School District property. Wetland C includes both emergent and forested wetland habitats (PEM/PFO) (Figure 2, Photo 7). The hydrogeomorphic (HGM) classification of Wetland C is considered to be both "slope" and "depressional outflow," and the wetland appears to be primarily groundwater fed. The 228th Street Creek (Channel A) flows through and along the south boundary of Wetland C. Surface water from Wetland C flows to a newly created fish rearing pond and fish ladder (228th Street Creek) before entering Little Bear Creek. Much of Wetland C has been affected by the placement of fill material consisting of gravel, sand, and glass. This fill material has likely resulted in plant community changes; for example, most areas are dominated by reed canarygrass. Further, the placement of fill has likely resulted in changes in wetland hydrology.

Wetland C emergent habitats are dominated by dense reed canarygrass and bentgrass. Soft rush and creeping buttercup are distributed in patches. Palustrine forested habitat, making up the east portion of Wetland C, is dominated by large western red cedar trees and snags with an understory of reed canarygrass (Photo 7). Thickets of red alder and salmonberry dominate the forest community near the BNSF railroad line.

The principal functions of Wetland C include water quality improvement, erosion control, production and export of organic material, general habitat, and habitat for aquatic invertebrates. Dense emergent vegetation traps sediments and other potential pollutants in surface water flowing through Wetland C. The dispersed flow of groundwater and surface water prevents scouring in excavated channels in Wetland C. Dense mats of reed canarygrass and other herbaceous vegetation contribute organic matter to the adjacent fish rearing pond and Little Bear Creek. Though this function is generally viewed as supporting downstream life systems, in this case it may also contribute to lower dissolved oxygen and higher algal growth detrimental to fish using the pond. The interspersion of large tree snags and herbaceous vegetation provides habitat to a number of wildlife species including woodpeckers, small mammals, and songbirds including red-winged blackbird. A variety of substrates and water regimes are available for aquatic insects.

Though Wetland C does include both forested and emergent habitat types, these habitats are dominated by an invasive plant species, reed canarygrass. This aggressive non-native species limits the plant community diversity and habitat functions on the site. Fill soils also may limit the filtering and storage capacity of the wetland soils. Wetland C is separated from Wetland D by a gravel road and fill. Wetland functions would be greater for both of these wetlands if they were reconnected by removing the gravel road and fill soils and restoring these areas.

Other functions and values include flood flow alteration and uniqueness and heritage value due to the presence of a state candidate species (pileated woodpecker) in the wetland and a federal threatened species (Puget Sound chinook salmon) supported by substantial surface and groundwater flows from Wetland C. Some storm flow control is provided because Wetland C is relatively large (3 acres) and has a constricted outlet. Snags present in Wetland C provide foraging and potential nesting opportunities for pileated woodpecker. The wetland is located immediately upstream of Little Bear Creek, a Puget Sound chinook salmon and coho salmon (federal candidate) spawning stream.

Wetland D

Wetland D, a 1.0-acre palustrine scrub-shrub wetland (PSS), is located on the northwest corner of the Northshore School District property adjacent to SR-9 (north of Wetland C) (Figure 2, Photo 8). The HGM classification of Wetland D is "depressional outflow" because it is positioned in a slight topographic depression, and because surface water from this wetland outflows to adjacent drainage ditches. The main water source for Wetland D is groundwater springs and seeps. Sitka and Pacific willow, black cottonwood and red alder saplings have recently become established in this wetland, and reed canarygrass, creeping buttercup, and soft rush are also present.

The principal function of Wetland D is flood flow alteration because it is positioned in a slight depression, has dense vegetation that slows the flow of stormwater, and includes a constricted outlet that flows to an excavated ditch.

Other functions include nutrient and contaminant removal and general habitat suitability. Wetland D may serve to remove toxins from surface water that emanates from site soils, if present. Palustrine scrub-shrub habitat is developing and likely provides habitat for native songbirds and small mammals (though not wetland-associated species in particular). This habitat is also connected to adjacent upland grassland and forest habitats.

As stated for Wetland C, the functions of Wetland D are limited by the presence of non-native fill soils that separate Wetlands C and D and the presence of invasive plant species.

Wetland E

Wetland E is located in the northwest corner of the Woodinville North property, immediately south of Wetland C and east of SR-9 (Figure 2). Wetland E, was formerly a disturbed palustrine scrub-shrub/emergent (PSS/PEM) wetland. A fish rearing pond and fish ladder have recently been constructed to mitigate for the relocation and piping of 228th Street Creek beneath the Woodinville North site (Photos 9 and 10) (Talasaea, 1998). Wetland E now consists of 0.14 acre of palustrine open water (POW) habitat, with 228th Street Creek flowing though it (Photo 9).

The newly created pond and fish ladder system is protected by Snohomish County as a Native Growth Protection Area (Talasaea, 1998). Juvenile fish enter the fish rearing pond via a constructed culvert and fish ladder that allows fish passage between the pond and Little Bear Creek (Photo 10). Soft rush is present along the margins of the pond and native shrubs and trees, such as willow, western red cedar, and red-osier dogwood, have recently been planted along the berm located between the pond and SR-9.

Principal functions of Wetland E include flood flow alteration, general habitat, and fish habitat. Wetland E is designed, in part, as a stormwater detention facility to provide storm flow control for adjacent developed properties. Salmonid rearing habitat and waterfowl habitat are provided, though refugia for juvenile salmonids are limited. Wildlife species observed in or near the open water habitat of Wetland E included killdeer, mallard, bufflehead, belted kingfisher, red-winged blackbird, song sparrow, and Canada goose. The fish ladder and rearing pond within this wetland are situated within clear view of a public right-of-way (SR-9); therefore some educational value may potentially be provided to the community. Other functions, such as water quality treatment,

organic matter export, and general habitat, are still developing as new native plantings grow and mature.

Streams

Three streams (Howell Creek, 228th Street Creek, and Unnamed Creek) and six small watercourses are located on the Route 9 site. These three streams and other watercourses flow from the site directly to Little Bear Creek, a tributary to the Sammamish River within the Lake Washington Drainage Basin. Little Bear Creek enters the Sammamish River at river mile (RM) 5.4, immediately west of the City of Woodinville and approximately 3 miles downstream of the site.

The 228th Street Creek flows through two channels on the site. Channel A flows along the south boundary of the Northshore School District property and Channel B flows through a pipe beneath developed areas on the site and into the storm detention ponds and Wetland E, the fish rearing pond (Figure 2). Stream classifications for stream reaches on the site are summarized in Table 2.

Table 2. Stream Ratings and Standard Buffer Widths

Stream	Snohomish County Rating1	Urban or Rural Designation	Puget Sound Chinook Salmon Primary Association Area	Standard Buffer Width (feet)2
Howell Creek	Type 4	Urban	No	25
228th Street Creek (Channel B, piped onsite)	Type 4	Urban	No	None for pipe
228th Street Creek (in stream fish rearing pond and ladder)	Type 3	Urban	Yes	150/3003
228th Street Creek (Channel A)	Type 4	Rural	No	50
Unnamed Creek (downstream of the piped section on the VRJ LLC property)	Type 3	Rural	No	100
Unnamed Creek (upstream of the piped section on the VRJ LLC property)	Type 4	Rural	No	50
Little Bear Creek (offsite, west of SR-9)	Type 2	Urban and Rural	Yes	150/300

1 Snohomish County streams are classified based on water typing criteria in WAC 222-16-030 as adopted by the state in June 1993.

2 Standard buffer widths depend upon whether the stream is located within or outside of the Urban Growth Area (SCC 32.10.520) and whether or not the stream is considered to be a primary association area for Puget Sound chinook salmon (SCC 32.10.310 and SCC 32.10.320).

3 The standard buffer width for Puget Sound chinook salmon primary association areas extends to 300 feet for limits on the placement of any “effective impervious surface.”

Howell Creek

Howell Creek is a small stream located onsite near the south boundary (Figure 2). Howell Creek has one tributary located on the Route 9 site. This tributary is entirely piped within the site boundaries and joins Howell Creek east of SR-9. Howell Creek flows into Little Bear Creek north of the SR-9/SR-522 interchange and west of SR-9. A culvert beneath SR-9 appears to block upstream fish migration from Little Bear Creek onto the site. Two culverts located beneath local access driveways also fragment Howell Creek on the Route 9 site. Open portions of Howell Creek on the site flow through confined, rock-armored channels, approximately 2 feet wide and 100 feet in total length (Photo 11). In-stream substrates consist primarily of small gravels and sand. No fish use is expected onsite because habitat is blocked by numerous culverts and by a lack of riparian cover, large woody debris, pools, and other instream habitat features.

228th Street Creek

The 228th Street Creek, a stream with no official name but called 228th Street Creek for the purpose of discussion in this report, is a small channelized stream located along the south boundary of the Northshore School District property and between the undeveloped north and the commercial and industrial south portions of the site (Photo 12). The 228th Street Creek includes two main channels. Channel A is an open streambed that flows along the east and south boundaries of the Northshore School District property. Channel B is a piped channel flowing through the developed portion of the site. Before construction of the Woodinville North Business Park in 1998, 228th Street Creek (Channel B in Figure 2) flowed through the Woodinville North and Opus Northwest property to Little Bear Creek (Photo 13). This section of stream is now piped as shown in Figure 2, with a portion of the flow directed to the fish rearing pond and a portion of the flow directed to adjacent detention ponds east of the fish rearing pond.

On the site, Channel A flows for approximately 1,100 feet through a confined, excavated channel that is approximately 2 feet wide and less than 1 foot deep. Channel A forks into two parts at the east end of the Northshore School District property (Figure 2). Streambed substrates are generally silt, sand, and small gravels. Colored glass from imported fill soils are also present here. Riparian areas are dominated by reed canarygrass with sparse shrub and tree cover. The stream flows into an excavated area dominated by cattails before flowing through a trash rack fitted culvert to the fish rearing pond. Fish habitat is limited onsite, and fish access is blocked upstream of the fish rearing pond.

Fish Rearing Pond

A newly constructed fish rearing pond, fish ladder, and fish-passable arch culvert located beneath SR-9 convey 228th Street Creek (Channels A and B) to Little Bear Creek (Photos 9 and 10). These new habitat enhancement features were constructed in the fall of 1998 on the northwest portion of the Woodinville North property. The 228th Street Creek fish ladder and fish rearing pond were designed to accommodate juvenile salmonids and to provide refuge from high water in Little Bear Creek. The pond and other features were constructed as mitigation for site development that involved piping the original 228th Street Creek through the Woodinville North site and converting wetlands into stormwater detention facilities and the fish rearing pond.

The fish rearing pond is fed by surface water flows from 228th Street Creek (Channel A) and a portion of the piped 228th Street Creek (Channel B). Beneath the Stockpot Soup parking lot, a flow-splitter diverts 60 percent of the flows from Channel B into the fish rearing pond and 40 percent into an adjacent detention pond that overflows into the fish rearing pond.

The rearing pond is a rectangular open water area that was constructed above the elevation of SR-9. The rearing pond is connected to Little Bear Creek via a newly constructed culvert and a uniformly constructed outlet channel. The elevation of the outlet channel is controlled by concrete weirs. Some of the weirs have failed, creating a possible migration barrier for juvenile fish migrating from Little Bear Creek into the pond during low flows.

The pond may be accessible during higher flow periods in the late winter and early spring, but low water quality and high summer temperatures are anticipated to limit year-round use of the pond by salmonid fish. WDFW has stated that juvenile coho salmon and cutthroat trout use the fish ladder and fish rearing pond (Pentico, personal communication, 2002). During a site visit in May 2002, an Adolfson biologist observed juvenile fish jumping and striking the surface of the water within the fish rearing pond. Fish access is blocked upstream of the fish rearing pond by a L-shaped pipe control structure (Middaugh, personal communication, 2003).

The fish rearing pond and Little Bear Creek (offsite) are regulated by Snohomish County as Puget Sound chinook salmon primary association areas (SCC 32.10.310 and SCC 32.10.320).

Unnamed Creek

Unnamed Creek is a small stream that flows through the VRJ LLC property on the north portion of the site (Figure 2 and Photo 5). The stream is piped for approximately 300 feet beneath a gravel parking and staging area on the east portion of the VRJ LLC property. The overall habitat of Unnamed Creek is disturbed; however, the stream habitat is less disturbed upstream of the piped section than downstream of this section. Unnamed Creek receives flows from groundwater springs from the north and the east and overflow from nearby farm ponds. The stream is more than 2 feet wide downstream of the piped section, and varies between 2 and 3 feet in width upstream of the piped section. Small gravels, silts, and sands dominate stream substrates. Talasaea (2003) observed juvenile trout downstream of the piped stream section where water was backed up behind a culvert under SR-9 in October 2002. However, fish habitat appears to be limited upstream of the piped section due to high gradients and blockage created by the culvert under SR-9. Between SR-9 and the piped stream section, the stream is confined to a narrow, incised channel. The riparian area is composed of a narrow strip of mixed deciduous and coniferous trees and shrubs. Much of the riparian area is composed of lawn or is used by a landscape business for plant storage or parking. Upstream of the piped section, the stream meanders through a broad swale and is surrounded by upland forest that contains some mature trees.

Other Watercourses

Six other watercourses have been identified on the south portion of the Route 9 site (Figure 2). These watercourses convey storm drainage and groundwater from the steep slope and developed areas east of the site and several watercourses appear to receive additional runoff from the site.

The two southernmost watercourses join Howell Creek west of SR-9, and the four northern watercourses discharge to a roadside conveyance ditch east of SR-9 and flow directly to Little Bear Creek via a single culvert. The two northernmost watercourses are contained in rock-lined, open water channels for approximately half of their length through the site and in underground pipes for half of their length; the other watercourses are entirely piped through the site. Open water channels are approximately 2 feet wide with grass- or rock-lined banks. Substrates consist of silt and small gravel. None of the watercourses contain habitat conducive to fish rearing.

Special Status Species

Special status species include species designated by federal or state government agencies (U.S. Fish and Wildlife Service, NOAA Fisheries, and WDFW) as endangered, threatened, proposed, candidate, sensitive, and monitor species. Also included are species of local importance designated by King County. Special status wildlife species that may be found foraging, resting, or breeding on the Route 9 site are discussed in the following paragraphs. Overall, up to 16 special status wildlife species may occur on the site.

Threatened and Endangered Species

The **bald eagle** is listed as a federal and state threatened species. Bald eagles are both residents in and migrants through the Puget Sound region. Eagle populations are usually highest in the region in the winter months, when both resident birds and winter migrants are present due to the mild winter climate and abundant fall salmon runs (Stinson et al., 2001). Bald eagles generally perch, roost, and build nests in mature trees near water bodies and available prey, usually away from intense human activity. They prey on a variety of foods including fish, birds, mammals, carrion, and invertebrates. In the Puget Sound region, waterfowl and fish are generally the most common food for eagles (Watson, 2002). Bald eagles typically return to one of several nests located within an established nesting territory (Stalmaster, 1987). Their seasonal home range for foraging and nesting averages 1.8 square miles in this region (Watson, 2002).

No prime bald eagle foraging or nesting habitat is found on the Route 9 site. Bald eagles may be attracted to fish or waterfowl prey in the detention or fish rearing ponds or in Little Bear Creek adjacent to the site. The closest documented bald eagle nest is located near the north shore of Lake Sammamish, approximately 3 miles south of the Route 9 site (WDFW, 2003).

The **Puget Sound chinook salmon evolutionarily significant unit (ESU)** is federally listed as threatened and is considered a state candidate species. Critical habitat for this ESU has been designated and includes all waters that could be used by chinook salmon in the Puget Sound region. Little Bear Creek, located offsite, and the fish rearing pond are considered to be critical habitat for chinook salmon. Chinook require varied habitats during different phases of their life. Spawning habitat typically consists of riffles and the tailouts of pools with clean substrates dominated by cobbles. These habitats are located in the mainstem of rivers and large tributaries. Juvenile chinook rear in the lower mainstem of rivers and tributaries before entering the estuary and salt marshes (Myers et al., 1998). Adult chinook salmon spawn in freshwater streams in the late summer and fall. Fry emerge in the late winter and early spring. Juvenile chinook may rear

in fresh water from 3 months to 2 years (NOAA Fisheries, 1998); however, most juvenile chinook in the Lake Washington Basin are expected to smolt within the first year after emergence. Chinook salmon are present in Little Bear Creek. No age-at-smoltification data were located specific to Little Bear Creek, but it is noted that chinook fry normally rear up to 90 days in Little Bear Creek before ascending into Lake Washington (Williams et al., 1975). Chinook generally migrate to salt water in the spring and summer.

Salmon spawning survey data from WDFW from 1952 through 2000 demonstrate that low numbers of chinook salmon spawn in Little Bear Creek. The first record is from 1971 (DEAI, 2002). Observations were made late in the chinook spawning season from September 29 through November 3 with the higher counts occurring upstream of the site between RM 4.4 and 5.5 (DEAI, 2002). WDFW planted more than one million fry and fingerling Chinook salmon into Little Bear Creek from 1983 through 1992 (DEAI, 2002). Chinook adults were identified during 2001 stream surveys south of 205th Street on the lower portion of Little Bear Creek, approximately 0.5 mile downstream from the Route 9 site (Foley, personal communication, 2001). Small numbers of chinook may spawn in Little Bear Creek near the site; they are sighted occasionally upstream of 205th Street.

The **bull trout** is federally listed as threatened and is considered a state candidate species. This species is most commonly associated with pristine or only slightly disturbed basins (USFWS, 1998). Bull trout spawn in streams with clean gravel substrates and cold (below 9 degrees Celsius) water temperatures (USFWS, 1998). Reproducing populations of bull trout are not known to occur in Lake Washington or its northern tributaries, including Little Bear Creek. In addition, although no physical barriers are present, Little Bear Creek and its tributaries do not appear to provide suitable habitat for bull trout due to high summer water temperatures, high turbidity, chemical contaminants, and chronically high levels of scouring and sedimentation in the stream.

Candidate and Sensitive Species

Puget Sound coho salmon are federal candidate species. Adult coho salmon spawn in freshwater streams in the late fall and early winter. Coho typically spawn in low gradient riffles with clean substrates ranging from pea-sized gravels to orange-sized cobbles (Henry, 1995). Rearing juveniles prefer off-channel pools with complex cover including both large and small woody debris (Henry, 1995). Juvenile coho rear in fresh water for a year to 18 months.

Coho salmon spawn and rear in Little Bear Creek, and juvenile coho use the newly constructed fish ladder and pond (Pentico, personal communication, 2003). Salmon spawning data from WDFW from 1952 through 2000 demonstrate "fair" to abundant numbers of coho salmon in Little Bear Creek. However, lower numbers of coho salmon have been observed in the late 1980s to early 1990s. The annual average total number of observations before 1991 was approximately 460, and after 1991 the annual average was 68 with a high of 168 in 1995 (DEAI, 2002). WDFW and other organizations have planted over four million emergent, fingerling, fry, pre-smolt, and smolt coho salmon into Little Bear Creek between 1952 and 1997 (DEAI, 2002).

The **pileated woodpecker** is a state candidate species. Pileated woodpeckers are relatively common in the Puget Sound region in forest habitat, especially where large tree snags, important

for foraging and nesting, are abundant. The species excavates cavities in tree snags or live trees with dead wood at least 12 inches in diameter for roost and nest sites (Rodrick and Milner, 1991). Locating specific nest sites from year-to-year is difficult because the woodpeckers do not usually return to the same nest tree in successive years. Pileated woodpeckers forage on large snags (larger than 20 inches), logs (larger than 7 inches), and stumps, primarily in forests more than 40 years old. They will also forage in riparian hardwoods and immature forest stands (Rodrick and Milner, 1991).

Adolfson biologists observed a pair of pileated woodpeckers on the Northshore School District property on the north part of the site, and numerous pileated woodpecker excavations and foraging signs on tree snags in forested habitats on the site. No nests have been recorded or observed on the site (WDFW, 2003). Potential nesting habitat, however, is available in mature forest on the north portion of the site.

The **Vaux's swift** is a state candidate species that may be found foraging on flying insects in forest habitats and above open water habitats. Vaux's swifts usually nest in dead trees, and occasionally in chimneys. Vaux's swift is common in the Seattle area and suitable habitat exists in residential areas (Smith et al., 1997). Vaux's swift is likely to forage over the Route 9 site and may nest on the Northshore School District property where large tree snags are present. No nests have been recorded in the site vicinity (WDFW, 2003).

The **merlin** is a state candidate species. They are rare in Washington State. Merlin have been sighted in the Puget Sound region, most commonly in winter (Hunn, 1982; Smith et al., 1997). The merlin is a falcon that nests in tree cavities and in the old nests of other bird species such as crow, raven, and hawk (Smith et al., 1997). They forage on a variety of bird, mammal, reptile, amphibian, and insect species (Terres, 1995). Merlin are unlikely to be found on the site because they are relatively rare in this region, and because only a few mature trees with potential for nesting are found on the site.

The **western (or Townsend's) big-eared bat** is a state candidate species and a federal species of concern. Western big-eared bats depend on caves, mines, abandoned buildings, and bridges for breeding, roosting, and hibernation sites (Rodrick and Milner, 1991; Perkins and Levesque, 1987). They forage on insects in nearby forests. Only a few breeding sites have been confirmed in Washington State (Rodrick and Milner, 1991). These bats may potentially forage for insects on the Route 9 site; however, breeding, roosting, and hibernation sites are not available on the site.

Keen's myotis is a state candidate species. The Keen's myotis has the smallest geographic range of any bat in North America, ranging from Northwest Washington and western British Columbia into Alaska. This bat is associated with forested areas and is a solitary rooster in tree cavities and cliff crevices. Though not a common bat, this species is listed as being present in the Puget Sound region by Bats Northwest (2000). Potential foraging and roosting habitat for this species exists on the Route 9 site; however this species is not likely to be found on the site because potential roost sites are limited to a few mature trees on the site.

The **western toad** is a state candidate species. The western toad is no longer common in the lowlands of western Washington (Leonard et. al, 1993). Western toads, if any remain on the

Route 9 site, would most likely be found in or near wetlands on the site. Amphibian monitoring studies conducted as part of the Puget Sound Wetlands and Stormwater Management Program found western toads in only four of the 38 wetlands surveyed from 1994 through 1997 in King County (Richter and Azous, 2000). Two of the wetlands with western toads were in the Big Bear Creek Basin, which is located east of and adjacent to the Little Bear Creek Basin (Richter and Ostergaard, 1999). However, this species is not likely to be found on this site because of the highly disturbed nature of the wetlands and upland habitat on this site, and because this species has become relatively rare in recent years in this region.

The **peregrine falcon** is a state sensitive species that is relatively rare in the Puget Sound region, with nests located near the Puget Sound shoreline (Smith et al., 1997). Peregrines typically nest on cliffs and sometimes on tall buildings. They feed primarily on doves, songbirds, shorebirds, and waterfowl (Terres, 1995). Although not common in the region, peregrine falcons may occasionally forage on birds at the Route 9 site. No nests are known to exist within 5miles of the Route 9 site (WDFW, 2003).

State Monitor Species

The **great blue heron** is a state monitor species. Great blue herons are relatively common in the Little Bear Creek Basin as they forage in wetlands and along the shorelines of ponds and lakes. However, no nesting colonies are known to exist in the Little Bear Creek Basin, perhaps due to a lack of undisturbed, mature forest near prime foraging areas. The closest known nesting colony is located near Swamp Creek, approximately 5 miles southwest of the site (WDFW, 2003). Great blue heron may forage in wetlands or ponds on the Route 9 site.

The **green heron** is a state monitor species. This species is an uncommon inhabitant of freshwater wetlands in Western Washington (Smith et al., 1997). The green heron feeds on small fish and invertebrates in shoreline areas. It is a colony nester, nesting near wetlands or shoreline areas in shrubs or trees (Terres, 1995). Although habitat for the green heron is available on the Route 9 site, it is more likely to be found in larger and less disturbed wetland systems with a greater abundance of fish and invertebrates. Wetlands associated with North Creek, Swamp Creek, and Lake Washington located a few miles west and south of the Route 9 site are more likely to provide breeding and foraging habitat for green herons.

Long-eared myotis and **long-legged myotis** are state monitor species. These bats forage on insects in a variety of habitat types, although they are commonly sighted foraging over forest openings and open water. These bats will roost beneath tree bark, in buildings, caves, or mines (Christy and West, 1993). According to Bats Northwest (2000), these species are likely to be found in the Puget Sound area. These bat species may forage over the ponds and forest openings on the Route 9 site, and they may roost beneath tree bark on snags and live trees on the site.

Species of Local Importance

King County considers the **red-tailed hawk** to be a species of local importance; however, this species does not have special status in Snohomish County. They are no longer considered a special status species by WDFW because their populations are rising (Smith et al., 1997). Red-tailed hawks are protected at the state and federal level under the federal Migratory Bird

Protection Act. Red-tailed hawks prefer a mix of forest and open grassland habitats for nesting and foraging. They nest in trees and will defend the same nesting territory in successive years (Terres, 1995). They prey on small mammals, birds, and reptiles (Fitch et. al, 1946).

The north and east portions of the Route 9 site contain prime habitat for red-tailed hawk foraging and nesting with their mix of forest and open grassland habitats. Red-tailed hawks were observed on the site during the January 15, 2002 site visit and during wetland field investigations on other days. No nests have been observed onsite by Adolfson or others (Talasaea, 2003).

Federal Species of Concern

Several species listed as federal species of concern may also be found on the Route 9 site. These species may be designated in the future as endangered, threatened, or candidate if this is deemed necessary for sustaining these species at the federal level. Federal species of concern include the **willow flycatcher, olive-sided flycatcher, red-legged frog,** and **Yuma myotis**. These species may occur in riparian, wetland, and forest habitats on the site. The willow flycatcher may forage or breed in riparian-wetland habitats on the site.

Limitations

Within the limitations of schedule, budget, and scope-of-work, we warrant that this study was conducted in accordance with generally accepted environmental science practices, including the technical guidelines and criteria in effect at the time this study was performed, as outlined in the Methods section. The results and conclusions of this report represent the authors' best professional judgment, based upon information provided by King County and others in addition to that obtained during the course of this study. No other warranty, expressed or implied, is made.

References

AGRA Earth & Environmental. 1997. *Site Assessment and Remediation Voluntary Cleanup Program BDZ Development, 22701 Highway 9 South*.

Bats Northwest. 2000. *Washington State Bats: Bats You're Likely to See (or Hear) Around Puget Sound*. Retrieved November 8, 2000, from http://www.batsnorthwest.org/).

Christy, R.E. and S.D. West. 1993. *Biology of Bats in Douglas-Fir Forests*. U.S. Department of Agriculture, Forest Service. Pacific Northwest Research Station. Portland, Oregon. PNW-GTR-308.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* U.S. Fish and Wildlife Service. Publ. # FWS/OBS-79/31. 131 p.

DEAI (David Evans and Associates, Inc.). 2002. *Little Bear Creek Corridor Habitat Assessment*. Prepared for the City of Woodinville, Washington.

Debose, A., and M.W. Klungland. 1983. *Soil Survey of Snohomish County Area, Washington*. U.S. Soil Conservation Service, Washington, D.C.

Ecology (Washington State Department of Ecology). 1993. Washington State Wetlands Rating System, Western Washington. Washington State Department of Ecology Publication No. 93-74.

Ecology (Washington State Department of Ecology). 1997. *Washington State Wetlands Identification and Delineation Manual*. Washington State Department of Ecology, Publication No. 96-94.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

Enviros, Inc. 1996. *Final Report Phase I and II Environmental Site Assessment of the Property Located at 22701 Highway 9 South*.

Farallon Consulting. 2001a. *Phase I Environmental Site Assessment, Woodinville 522, 22701 Highway 9 South*.

Farallon Consulting. 2001b. *Revised Final Phase II Subsurface Investigation, Woodinville 522 Lots 3 and 4, 22701 Highway 9 SE*.

Farallon Consulting. 2001c. *Site Characterization Report, Woodinville 522 Lots 3 and 4, 22701 Highway 9 SE*.

Fitch, H.S., F. Swenson, and D.F. Tillotson. 1946. *Behavior and Food Habits of the Red-tailed Hawk*. The Condor. 48:5. Pages 205-237.

Henry, R. 1995. *Backgrounder: Coho Salmon and the State Endangered Species Act Special Publication*. Oregon Department of Fish and Wildlife. Portland, Oregon.

Hunn, E.S. 1982. *Birding in Seattle and King County*. Seattle Audubon Society. Seattle, Washington. 160 pp.

Johnson, D.H. and T.A. O'Neil. 2001. *Wildlife-Habitat Relationships in Oregon and Washington*. Oregon State University Press. Corvallis, Oregon. 736 pp.

Kauffman, J.B., M. Mahrt, L.A. Mahrt, and W.D. Edge. *Chapter 14 Wildlife of Riparian Habitats*. In Johnson, D.H. and T.A. O'Neil. 2001. *Wildlife-Habitat Relationships in Oregon and Washington*. Oregon State University Press. Corvallis, Oregon.

King County. 2002a. *Draft Environmental Impact Statement: Brightwater Regional Wastewater Treatment System November 2002*. Department of Natural Resources and Parks, Wastewater Treatment Division. Volumes I and II.

King County. 2002b. *Digital Aerial Photography*.

Leonard, W.P., H.A. Brown, L.L.C. Jones, K.R. McAllister, R.M. Storm. 1993. *Amphibians of Washington and Oregon.* Seattle Audubon Society. Seattle, Washington. 168 pp.

LSA (Lovell-Sauerland & Associates). 2000. *Engineering and Drainage Report for Woodinville Business Park Site C & D, Highway 9 and 228th Street SE, Snohomish County, Washington*.

Myers, J. M, R. G. Kope, G. J. Bryant, D. Teel, L. J. Lierheimer, T. C. Wainwright, W. S. Grant, F. W. Waknitz, K. Neely, S. T. 1998. *NOAA Technical Memorandum NMFS-NWFSC-35 Status Review of Chinook Salmon From Washington, Idaho, Oregon, and California*. NOAA. Seattle, WA.

NCAI (Nelson-Couvrette & Associates, Inc.). 1999. *Geotechnical Engineering Report: Landslide Evaluation. Campbell Soup Project*.

NCAI (Nelson-Couvrette & Associates, Inc.). 2000a. *Geotechnical Engineering Report: Woodinville Business Park – Building B*.

NCAI (Nelson-Couvrette & Associates, Inc.). 2000b. *Geotechnical Engineering Report: Woodinville Business Park – Buildings B and C*.

NOAA (Fisheries National Marine Fisheries Service). 1998. 50 CFR Parts 222, 226 and 227, *Endangered and Threatened Species: West Coast Chinook Salmon Listing Status Change; Proposed Rule*.

Null, W.S., G. Skinner, and W. Leonard. 2000. *Wetland Functions Characterization Tool for Linear Projects*. Washington State Department of Transportation, Environmental Affairs Office. Olympia, Washington.

Perkins, J.M. and Levesque, C. 1987. *Distribution, Status, and Habitat Affinities of Townsend's Big-eared Bat (Lecotus Townsendii) in Oregon*. Oregon Department of Fish and Wildlife. Technical Report #86-5-01.

Raedeke Associates, Inc. 1997. *Wetland and Stream Inventory of the Waterman Property, Snohomish County, Washington*.

Richter, K.O., and A.L. Azous. 2000. *Chapter 5 Amphibian Distribution, Abundance, and Habitat Use. in* Wetlands and Urbanization: Implications for the Future (A.L. Azous. And R.R. Horner, eds.). Lewis Publishers. New York. 338pp.

Richter, K.O., and E.C. Ostergaard. 1999. *King County Wetland-Breeding Amphibian Monitoring Program: 1993-1997 Summary Report*. King County Department of Natural Resources, Water and Land Resources Division, Seattle, Washington, USA.

Rodrick and Milner. 1991. *Management Recommendations for Washington's Priority Habitats and Species*. Washington Department of Wildlife.

Smith, M.R., P.W. Mattocks, Jr., and K.M. Cassidy. 1997. *Breeding Birds of Washington State*. Volume 4 *in* Washington State Gap Analysis – Final Report (K.M. Cassidy, C.E. Grue, M.R. Smith, and K.M. Dvornich, eds.). Seattle Audubon Society Publications in Zoology No. 1, Seattle, 538 pp.

Snohomish County. 1987. *Snohomish County Wetland and Stream Inventory*.

Stalmaster, M.V. 1987. *The Bald Eagle*. Universe Books. New York. 227 pages.

Stinson, D.W., J.W. Watson, and K.R. McAllister. 2001. *Washington State Status Report for the Bald Eagle.* Washington State Department of Fish and Wildlife. Olympia, Washington.

Talasaea Consultants. 1998. *Wetland and Stream Report for the Woodinville North Business Park, Snohomish County, Washington*.

Talasaea Consultants. 2003. *Wetland and Stream Delineation Sketch Maps for the VRJ LLC Property, Snohomish County, Washington*.

Terra Associates, Inc. 2001. *Geotechnical Report, Woodinville 522 Business Park, State Route 9 and 228th Street NE, Buildings C and D, Snohomish County, Washington*.

Terres, J.K. 1995. *The Audubon Society Encyclopedia of North American Birds*. Wings Books. New Jersey. 1109 pp.

U.S. Army Corps of Engineers. 1944. *Aerial photograph*.

USFWS (U.S. Fish and Wildlife Services). 1998. *A Framework to Assist in the Making of Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulations Watershed Scale (Draft).* U.S. Fish and Wildlife Service.

USFWS (U.S. Fish and Wildlife Service). 2003. *Listed and Proposed Endangered and Threatened Species, Critical Habitat, Candidate Species, and Species of Concern that may Occur in the Vicinity of the Proposed Brightwater Wastewater Treatment Facility Project in King and Snohomish Counties, Washington*. FWS REF 1-3-03-SP-0800.

WA DNR (Washington State Department of Natural Resources). 2002. *Natural Heritage Database*.

Walker & Associates. 2003. *Aerial photographs of the Route 9 site in 1947, 1967, 1976, 1985, and 1993, approximate scale: 1"=400'*.

Watson, J. 2002. *Comparative Home Ranges and Food Habits of Bald Eagles Nesting in Four Aquatic Habitats in Western Washington.* Northwestern Naturalist 83:101-108.

WDFW (Washington State Department of Fish and Wildlife). 2003. *Habitats and Species Database*.

WDFW (Washington State Department of Fish and Wildlife). Undated. *Management Recommendations for the Red-tailed Hawk (Buteo jamaicensis).* WDFW, Olympia, WA.

Williams, R. W., R.M. Laramie, and J. J. James. 1975. *A Catalog of Washington Streams and Salmon Utilization: Volume 1, Puget Sound Region*. Washington State Department of Fisheries. Olympia, Washington.

Personal Communications

Foley, Steve. 2001. *Telephone Communication on December 21, 2001*. Fisheries Biologist. Washington State Department of Fish and Wildlife. Mill Creek, Washington.

Middaugh, R. 2002. *Site Meeting on March 7, 2002*. Snohomish County Planning Department. Everett, Washington.

Middaugh, Randy. 2003. *Telephone Communication on March 25, 2003*. Senior Biologist. Snohomish County Planning and Development Services. Everett, Washington.

Pentico, Eric. 2002. *Field Meeting on May 8, 2002*. Fisheries Biologist. Washington State Department of Fish and Wildlife.

FIGURES AND PHOTOS

VRJ LLC
VRJ LLC
VRJ LLC
NORTHSHORE SCHOOL DIST #417
WOODINVILLE NORTH JOINT VENT.
WOODINVILLE NORTH ONE, LLC (STOCKPOT, INC.)
OPUS NORTHWEST LLC
OPUS NORTHWEST LLC
WOODINVILLE NORTH JOINT VENT.
BEAR CREEK GRANGE #1083
228TH ST. SE
LYDIG
CRANE
ENGLISH
KENNEDY EVERGREEN
LINCOLN INVESTMENTS LLC
KENNEDY-EVERGREEN
HOUSE
RENNEBOHM
FITZPATRICK
WATERMAN PROPERTIES LP
LEGACY INTERNATIONAL INC
FITZPATRICK/ FITZPATRICK
9
522
BURLINGTON NORTHERN SANTA FE RAILROAD

Legend

- Snohomish County UGA
- Woodinville UGA
- Parcel Boundaries
- Route 9 Site

N

0 125 250 500 Feet

May 2003

L:\ENVIR IMPACTS\2001 projects\21046.3 Brightwater Phase 3\EIS_GIS\EIS_rt9_owners.mxd 5/29/2003

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

The information included on this map has been compiled from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

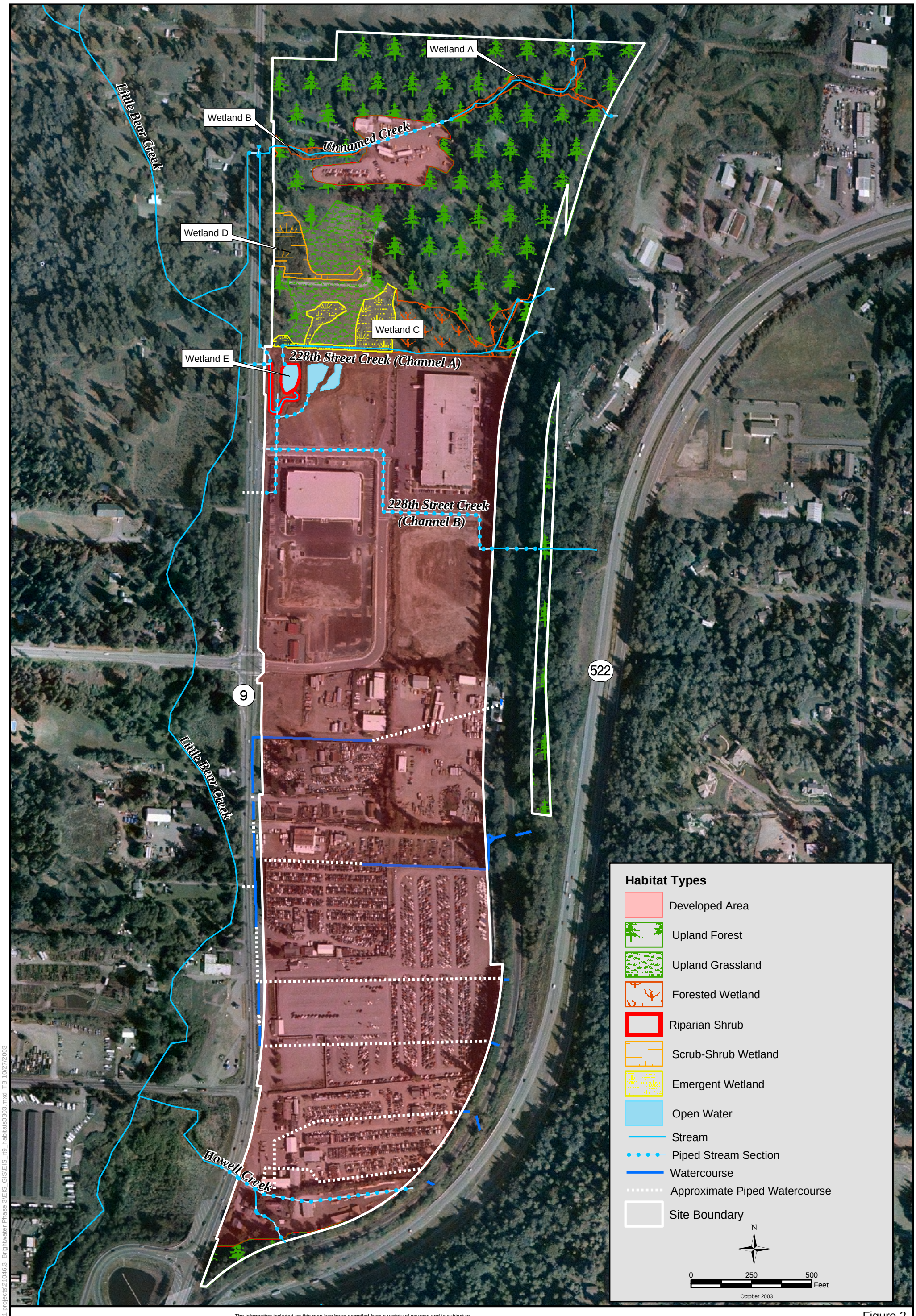
Data Sources: Snohomish County GIS; Snohomish County Assessor, 2003

File Name: rt9_owners.mxd

Figure 1

Property Ownership

BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM



King County
Department of
Natural Resources and Parks
Wastewater Treatment
Division

The information included on this map has been compiled from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

Sources: Aerial photos, King County (2002); Streams, wetlands and watercourses, Snohomish County (2002), Adolfson and Talasaea field surveys (2002, 2003), CH2MHILL CADD survey (2002), Reid Middleton CADD survey (2003)

File Name: EIS_rt9_habitats0303.mxd Prepared by: Adolfson Associates, Inc.

Figure 2

Habitat Types on the Route 9 Site

BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM

L:\ENVR IMPACTS\2001 projects\21046.3 Brightwater Phase 3\EIS_GIS\EIS_rt9_habitats0303.mxd TB 10/27/2003

Photo 1. Industrial storage yards at the south end of the Route 9 site, view northwest from the BNSF railroad line (January 22, 2003).

Photo 2. Storm water runoff from the south portion of the Route 9 site, view of a ditch located along the east shoulder of SR-9 (January 22, 2003).

Photo 3. Upland forest: large tree single story closed structural conditions on the Northshore School District property (January 15, 2002).

Photo 4. Upland forest, shrub/seedling-closed, and grassland (foreground) structural conditions on the Northshore School District property (January 15, 2002).

Photo 5 . Wetland A and Unnamed Creek riparian area on the northeast portion of the VRJ LLC property (January 22, 2003).

Photo 6. Wetland B and Unnamed Creek, view east from SR-9 (December 19, 2001).

Photo 7. Wetland C palustrine emergent and forested habitats, view south of the east portion of Wetland C (January 30, 2003).

Photo 8. Palustrine scrub-shrub habitat in Wetland D, view north (March 26, 2003)

Photo 9. Wetland E - Fish rearing pond on the northwest portion of the Woodinville North Joint Venture property, view north (December 19, 2001).

Photo 10. 228th Street Creek fish ladder paralleling SR-9 on the northwest portion of the Woodinville North Joint Venture property, view south (January 2, 2002).

Photo 11. Howell Creek, view south at the south end of the site (December 27, 2001).

Photo 12. The 228th Street Creek Channel A riparian and emergent wetland habitat on the Northshore School District property, view west (January 15, 2002).

Photo 13. Little Bear Creek and SR-9 adjacent to the site, view north (December 19, 2001).